UNPUBLISHED PRELIMINARY DATA

SEMI-ANNUAL STATUS REPORT 3/31/65

to NASA

RESEARCH GRANT NS G-533

FROM: Dr. Atam P. Arya
Department of Physics
West Virginia University

STUDY OF I^{129}

by

Dr. Atam P. Arya, and,
Research Assistant, Mr. Nicholas Nicholson

Atam P. Arya

SUMMARY

With the help of the interpretation of our experimental findings, we have been able to predict the spin of different energy levels and multipolarities of the gamma rays in I^{129}. Radioactive I^{129} was produced by bombarding Te^{128} by the neutron flux of 10^{13} nt/cm^2-sec in the Pennsylvania University Research Reactor for a period of 200 hrs. The detection apparatus consists of two NaI (Tℓ) crystals, single channel analyzers, multichannel analyzer and slow coincidence system. The decay scheme of I^{129} is shown in Fig. 1.

The gamma-gamma directional correlations were carried out for three different cascades of gamma rays: (Fig. 1.)

(1) 455-27 kev cascade,

(2) 273-275 kev cascade, and

(3) 1085-27 kev cascade.

The angular distribution for these three cascades were found to be

(1) $W(\theta) = 1 - (0.048 \pm 0.009)P_2(\cos\theta) + (0.025 \pm 0.010)\, P_4(\cos\theta)$

(2) $W(\theta) = 1 - (0.063 \pm 0.005)P_2(\cos\theta) + (0.054 \pm 0.008)P_4(\cos\theta)$

(3) $W(\theta) = 1 - (0.019 \pm 0.006)P_2(\cos\theta) - (0.047 \pm 0.010)P_4(\cos\theta)$

EVALUATION AND INTERPRETATIONS:

The interpretations of the gamma-gamma angular correlations for the three cascades has resulted in the spin assignment of

$\frac{7}{2}, \frac{5}{2}, \frac{5}{2}, \frac{3}{2}, \frac{3}{2}$ and $\frac{5}{2}$

to the levels at

ground state, 27-kev, 277-kev, 482-kev, 550-kev,

and 1112-kev, respectively. (Fig. 1.)

Also the experimental results have indicated the following multipolarities of different gamma rays:

27-kev $\longrightarrow$ (3 $\pm$ 1)% dipole + (97 $\pm$ 1)% quadrapole

455-kev $\longrightarrow$ (70 $\pm$ 12)% dipole + (30 $\pm$ 12)% quadrupole

277-kev (30 $\pm$ 10)% dipole + (70 $\pm$ 10)% quadrupole

or = or

273-kev (6 $\pm$ 4)% dipole + (94 $\pm$ 4)% quadrupole

1085-kev $\longrightarrow$ (8 $\pm$ 4)% dipole + (92 $\pm$ 4) % quadrupole

FURTHER EXPERIMENTS:

We are planning to continue the study of gamma-gamma directional correlations in Nd^{149} and Sb^{125} using the present facilities. The study of the decay schemes of these two samples will be made using solid-state detector which has far better resolution than NaI (Tℓ) detector.

PUBLICATIONS:

The results of the experimental investigation of I^{129} are in the process of being written. These results will be presented at the meeting of the American Physical Society and will be sent for publication in the "Physical Review" or "Nuclear Physics".

EXPANSION:

If the finances are available, the study of beta-gamma coincidence and correlations will be also started. The use will be made of the solid state detectors and the fast-slow coincidence system.

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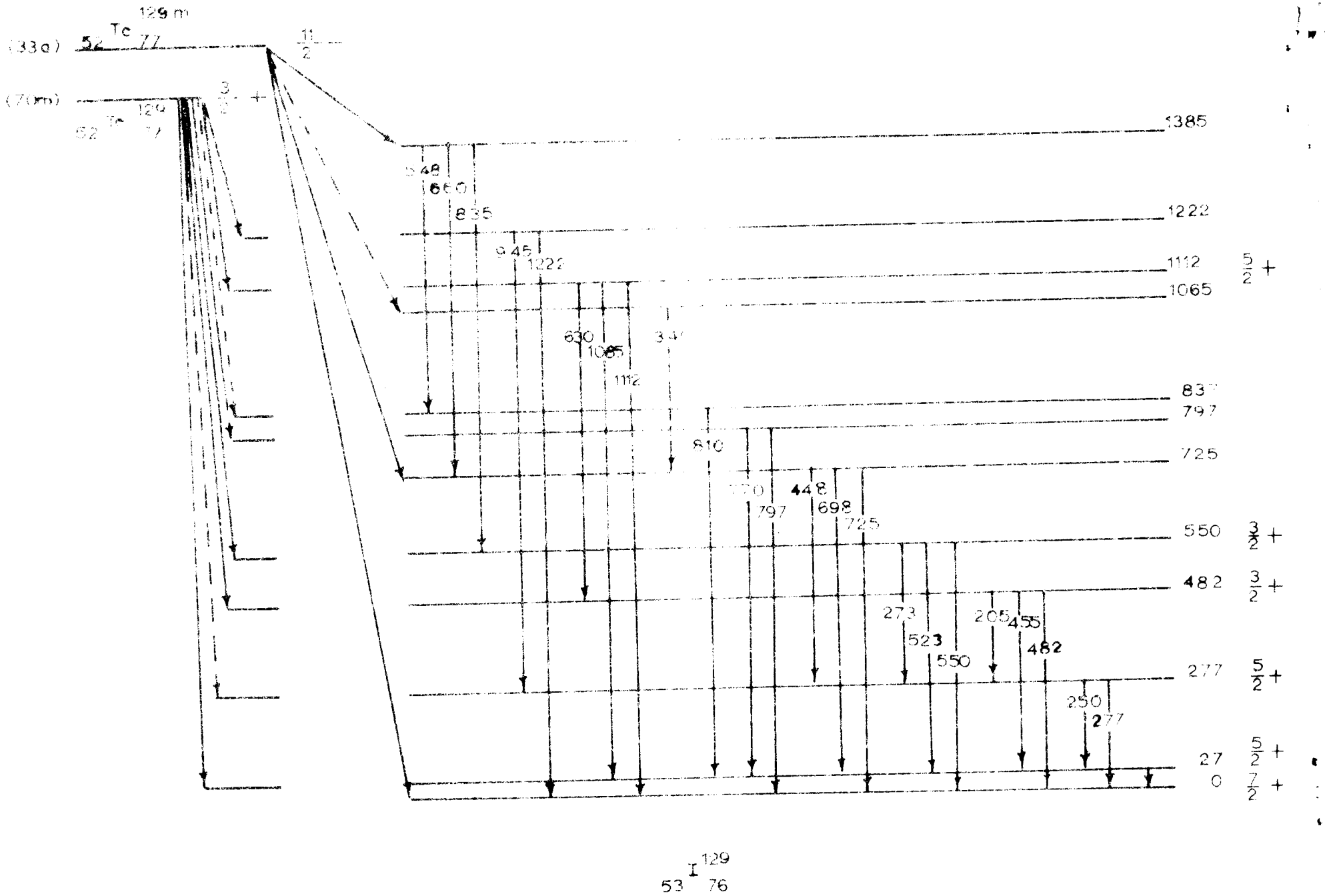
129 m
Te
52 77
(33 d)
11/2
(70 m)
3/2 +
1385
1222
1112
5/2 +
1065
837
797
725
550
3/2 +
482
3/2 +
277
5/2 +
27
5/2 +
0
7/2 +
548
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